HERPETOLOGICA

Established 1936
Organ of the HERPETOLOGISTS LEAGUE, A.A.A.S. Associate

Pres., Dr. Hobart M. Smith. Vice-Pres., Dr. Angus M. Woodbury
Secretary-Treasurer and Publisher, Chapman Grant,
2970 Sixth Avenue, San Diego 3, California.

Edited by the Officers. Policies determined by the Members.

Vol. 6 December 29, 1950 Part 7

THE IGUANA Iguana iguana iguana (L)

By Paul L. Swanson

The following observations on the iguana were made during a two year stay in Panama: in the tropical forest vicinity of Pacora, in the sabanas around La Chorrera and in the various habitats found within the Canal Zone.

TERMINOLOGY

The name iguana is the only one that I have heard used for this lizard by English speaking people, with the exception of show people in the United States who sometimes use more spectacular terms, such as "dragon". In Central America the Spanish-speaking people usually call the female *iguana* and the male *gorrobo*. The male is sometimes called *ministro* in El Salvador, and *guacho* in Costa Rica. The young, of course, is called *iquanita* or *gorrobito*. In Panama the lizard is facetiously called *gallina de palo*, "chicken of the tree." Most Americans consider any small lizards in the tropics iguanas, ameivas and basilisks in particular, just as they call almost any tree a mahogany tree.

STATE COLLEGE OF AGRICULTURE LIBRARY MAY 6 19 MANHATTAN KANSAS

SEXUAL DIMORPHISM

Males of this species show quite a variety of color; their heads vary from whitish, grayish, pinkish, to orange and black. The males in general have more orange and yellow coloring than the females, which are lighter colored and more greenish. Females are usually smaller than males of the same age, and the head is smaller in proportion to the body. The dorsal spines are shorter in the female, being from one-half to one inch in length, while those of the male are two inches or more. The male has a row of glands on the underside of each thigh. Externally they appear as disc-shaped, warty excrescences; just beneath the skin they are spherical in shape and measure from four to six millimeters in diameter. One male had 17 on one leg, 18 on the other.

There is a belief in El Salvador that these glands are warts. It is believed that a person can get warts from the blood of an iguana, unless it is washed off before it becomes dry. I have asked Salvadoreans why warts were common in the United States, where there were no iguanas. I was told that they could be acquired from inadvertently coming in contact with urine from a person having warts. When I asked how they explained the fact that children had warts more commonly than adults, I was told that they were transmitted through the mother. When told about the myth prevalent in the United States, that handling toads caused warts, they were not familiar with this belief, and denied vehemently that toads would cause warts.

AGRICULTURE AND LIBRARY MAY 6 MANHATTAN KANSAS STATE

Male iguanas either outnumber the females, in adults, or are more conspicuous in their habits. On one trip I collected seven males to one female. Possibly among the older population, more males survive predators than the smaller females.

HABITAT

The iguana is quite arboreal in its habits, but it is also at home on the ground. It is an excellent swimmer and takes voluntarily to the water to escape its enemies. I have never observed adults very far away from trees, although the young will wander quite a distance from them. They are particularly numerous in trees overhanging rivers, or perhaps they are more easily observed from the water. During cold, wet weather, they seem to prefer to stay on the ground, probably for greater warmth afforded by ground cover, such as brush, hollow logs, holes, etc. On one collecting trip, after a prolonged cool and wet period, I observed no iguanas in the trees. Then the sun came out, and as it rapidly warmed up, iguanas were noticed coming to the tops of bushes and ascending into the tops of trees. In favorable weather, they apparently spend most of the time in the trees and even sleep there overnight.

I once watched an old male, in a big fig tree near Gatun, for several days. The tree was more or less isolated from others, and as the iguana had an unusual reddish color to its head, I felt reasonably sure that it was the same specimen. I could see him from quite a distance, but when I came beneath the tree, he tried to keep a branch between us. I first noticed him on September 20. On the 21st I was working in the same locality and observed him every time I looked for him, from 7:30 a.m. until 2:15 p.m., when I left. On the 22nd I couldn't locate him. On the 23rd I saw him at 8 a.m. That day, while I was away eating my lunch, some of the men in my crew of laborers entertained themselves by catching this iguana for me. They had not known that I was watching it, and thought I'd be pleased with it.

Another large male was conspicuous in a big ceiba tree at Fort Davis. It was late in November, and the tree was bare of

leaves. The new leaves were coming out and the iguana was feeding on the new shoots. This lizard remained in the same tree for at least four days.

Their choice of trees is based mostly on the food available at the time, as they probably select the species according to the season of new shoots, flowers, fruit or leaves. Apart from the feeding angle, they seem to prefer heavily foliaged trees when the sun is bright, and when it is raining, more open trees are preferred, such as the wild fig. Species to which they seem particularly partial are the wild plums, *Spondias* species; the palo bobo, *Erythrina glauca;* the guacimo, *Luehea seemannii;* the wild cashew, *Espave excelsum,* to mention a few. They are liable to be found on almost any tree, however, even small species like the *Cecropias.*

I once saw two iguanas we had shaken from a tree run into an armadillo hole to escape capture. When frightened from a tree growing on the bank of a river, they prefer to jump into the water rather than on land. They usually swim under water and come up under brush along the shore line, if such is available. A jump from a tall tree doesn't seem to hurt them. I've seen them leap from heights of forty or fifty feet and apparently land unhurt. Some times their fall is broken by intervening branches, or brush, but even if they hit practically bare ground, it takes a "flying tackle" at the moment of contact to capture one before it runs away.

Very young iguanas are frequently seen on the ground, sometimes in open areas, and they are probably terrestrial to a large degree. I have never seen one under ten or twelve inches in a tree, although smaller lizards would naturally be more difficult to observe there than on the ground. (I have observed many small lizards of other species in trees, however.)

AGRICULTURE AND APPLIED SCIENCE LIBRARY MAY 6 1954 MANHATTAN KANSAS

LOCOMOTION

Iguanas are very agile climbers. I once observed a specimen climb the underside of a fairly large and smooth limb. They attempt to keep a limb between them and an observer, in the manner of a squirrel. Sometimes they will go from one tree to another, if the branches are interlaced, and I have seen them make short jumps from one tree to another. In leaping to the ground or to the water from a tall tree, they hold the legs closely to the body in flight. I have not been able to verify how they break their fall, but it would seem that they would have to extend the legs, and that they might use the tail to some extent. While the tail isn't so brittle as that of most lizards, one frequently captures specimens with part of the tail regenerated.

At rest in a tree, they sometimes sprawl out parallel to a limb with the hind legs dangling over into space, not even the claws being in contact with the limb.

In swimming, an iguana lets its four legs hang limply against its side, and propels itself with powerful strokes of the tail, much like a crocodilian. I have never seen one swim on the surface; they were always submerged.

Once I released an iguana on an open grassy area. At first it wouldn't try to run away, so I left it for about an hour, and when I returned it had started to walk. When it saw me, it began to run, but I overtook it easily, when it again became quiescent. Although this specimen travelled not more than seven miles per hour, I believe that an undisturbed adult could probably attain a speed of ten or twelve miles per hour for a short distance.

FOOD HABITS

One of the favorite foods of the iguana in Panama is the wild plum, *Spondias mombin*. The fruit is about 1¼ to 1½ inches in length, by about ¾ inch in diameter, shaped somewhat like a prune, and containing a large pit. It ripens over a long period in August and September. Of seven iguanas I dissected on September 26 (1943), five of them contained plums: 16, 29, 39, 41 and 79, respectively. The one with 16 plums also had many leaves in its stomach the others very few. One other contained leaves and seeds of the guacimo tree. The only female of the seven contained no plums and only a few leaves, but a great many seeds, which may woodsmen identified as fig seeds, although one of them disagreed and insisted that they were seeds of the canillo, *Miconia argentea*.

Other iguanas dissected contained fruit of the pepenance, *Ximenia americana*, and mango leaves. I have observed them eating the leaves of the morning glory, *Ipomoea* species, and new shoots of the ceiba, *Ceiba pentandra*. They undoubtedly eat many different species of leaves, blossoms, buds and fruit. Native Panamanians and Salvadoreans claim that they frequently eat leaves from vegetables in gardens. Several natives claimed that they had seen iguanas, not once, but a number of times, eat human excrement. In captivity I have had them eat ripe bananas.

Very young iguanas are probably almost entirely insectivorous, but I have made no personal observations on their feeding habits. I find no mention of stomach stones in my notes, nor do I remember finding any.

MATING

I have not observed iguanas in the act of mating. One of my workers saw a pair mating in El Salvador. If he remembered correctly it was in October. They were closely intertwined and upon the ground. Another claimed that they mated in November at the close of the winter (rainy season). It is very likely that mating takes place upon the ground; if it took place in trees it would be more often observed. Many of my men were excellent woodsmen and observers of nature, but few had ever seen iguanas mating.

EGG LAYING

The eggs are laid from early February to March. They are spherical in shape and have a white shell, about 30 mm. in diameter. One informant told me that they are laid on the ground and covered with dirt. They probably hatch in about three months. (Young iguanas are commonly seen from June on.) The number deposited

varies greatly; there may be as few as twenty or as many as seventy. A specimen dissected on a September 26 contained 72 eggs, varying from 3 to 6 mm. in diameter; the total number probably represented more than one clutch. Another examined on a November 21 contained 28 large eggs, of about 15 mm. in diameter, and many that were much smaller. Late in January the eggs are about 25 mm. in diameter.

GROWTH

Young iguanas are observed most often in June and July. A native observer said that they reached a length of about three feet at the end of their first year. This sounds reasonable, as in June or July most specimens seem to be under ten inches or over three feet in length. They probably attain full size in two years. Older specimens seem to become thicker in build but do not grow much in length. A specimen five feet in total length, and weighing about ten pounds, may be considered large. The largest specimen of many hundreds that came to my attention was caught at Fort Gulick, Canal Zone. It weighed 13¼ pounds, and measured 66½ inches in total length, 4 inches of the tail having been regenerated. With a normal tail it would not have been more than an inch or two longer. The snout to vent length was 20¼ inches. I have not seen wild ones (at large) that I thought were any larger than this specimen.

FREQUENCY

Iguanas are very common in many places where they occur. In a hunt for them near Margarita, Canal Zone, on a September 26, I personally observed 39 specimens in two hours; of these my five helpers caught 8. They undoubtedly saw many more that I did not. That afternoon I observed 20 more, although I was not hunting for them then.

Between Margarita and Gatun, while driving slowly along the road one morning shortly after sunrise, I counted 58 iguanas sunning themselves on the tops of trees, within a distance of three miles. It is not unusual to see four or five in a tree. We once routed 12 iguanas from one fig tree, *Ficus glabrata.*

ENEMIES

Many iguanas are marked by bad scars. According to the natives, most of the scars are the result of attacks by hawks. I have no reason to doubt this, as hawks are very numerous in the tropics, and the iguana's habit of basking in the tops of tall trees would make it very logical prey. The fear of hawks is the basis of a strategem for catching iguanas. The native whistles or screams like a hawk, which "freezes" the lizard and makes it easier to capture. I can not vouch for this personally, but I do not discredit it, as when frightened badly enough, an iguana usually remains motionless.

Boas and other snakes undoubtedly eat many iguanas. Small snakes are capable of eating young specimens. We once caught a boa, *Constrictor c. imperator* of only six feet in length that contained an adult iguana. It was a big meal for the snake, and the tremendous bulge it made in his body rendered the capture of the

snake very easy. I have no records of predatory mammals attacking iguanas, although I see no reason why they should not.

DEFENSE

The iguana's chief defense against its enemies is probably its ability to climb, run, and swim. Its protective coloration is an aid in escaping the notice of many potential enemies. It is amazing how inconspicuous it can be. I have talked to people who have lived in the Canal Zone for two or three years without having noticed a wild iguana, although they are present in large numbers in many parts of the Zone. Once when on a hunt, five good *campesinos* and myself could observe but three iguanas in a guacimo tree. A couple of the boys climbed it, and frightened *ten* iguanas to the ground.

Their keen vision helps them to avoid enemies. On an open sabana, one gave evidence of having seen me while I was still 100 yards away. I have tried to approach them in trees close enough to photograph, but could seldom get within 25 feet of one before it would leap to the ground.

Usually a captured specimen offers no resistance. If it is released and teased, it sometimes put up quite a show of angry defense. Some of my men once caught and released an iguana, unknown to me. I came upon it, thinking it a wild one, and when I got close enough, it lashed out with its tail, striking me on the side of my thigh between the knee and hip. It raised a welt which lasted several hours. It also threatened to bite. I took it into a cabin and thrust a broom at it. The lizard struck at the broom with his tail, then bit at it savagely, taking off part of the straw. Another specimen, trussed up in the usual Panamanian manner, managed to get its front legs loose and bruised one of my companions arms with its tail. Wounded specimens are much more likely to fight than uninjured ones. Some natives claim they can make a good account of themselves with a small dog.

COMMERCIAL VALUE

Iguanas are a source of meat for a great many tropical American people. Their use as food seems to be confined to the areas where they are indigenous, as they are seldom transported from the lowland tropics to the cities at higher elevations where the iguana does not occur. Most natives of Central America who live where iguanas occur consider them excellent food. The Jamaican negroes who worked for me in the Canal Zone could hardly conceal their disgust at people eating lizards. Some of the highlanders of Central America feel the same way. Personally, I think they are delicious.

Unlike most animals, old specimens are better eating than young ones, perhaps because they are not so agile, resulting in softer muscles than in young, active specimens. Their diet probably affects the taste also, as younger individuals may not have completely overcome the insectivorous habits of their infancy. Possibly when feeding on fruits they have a better flavor than when feeding

on leaves and other vegetation that would impart a flavor less palatable to humans. In the dry season they are not as good eating as in the rainy season. One I cooked for three hours in July remained tough and not very tasty. Just after egg laying, in March, to about July, they are at their worst. They are usually considered at their best in September and October. Many writers have mentioned tasting the flesh of the iguana and finding it unpalatable. In such cases, they have either let their imagination get the best of them, have tasted them at the wrong season or have tried too young a specimen. I have eaten many of them and find them delicious — equal if not superior to chicken.

The eggs are also considered a delicacy. I have eaten them, taken from an iguana and boiled. To me they tasted much the same as the hard boiled yolk of a hen's egg, and had much the same appearance. The natives also eat them dried, as sort of a confection.

The market value of iguanas varies much from country to country. In Panama, in 1943, at the market in Panama City, a large female with eggs sold for about $2.00 (males slightly cheaper). At the same time ,the best class of fish retailed for about 32 cents per pound; chickens 60 cents live weight and 70 cents dressed. Such an iguana would weigh 8 to 10 pounds. Turtle steaks were 30 cents per pound.

In El Salvador at the same time, a similar iguana sold for the equivalent of 30 cents to 40 cents U. S. In Nicaragua they could be bought for as little as 15 cents U. S.

Eggs of the iguana sold in Panama City at 7 for 10c and in Cartagena for as little as 4 for 1c U. S. In Barranquilla, a string of 50 was sold for about 25c U. S.

The iguana is a particularly convenient source of meat in hot places, as it can be kept alive for a long period without food or water. In Panama it is the custom to fold the legs over the back, securing them by slitting the skin of the toes and placing a claw of one foot through the tendons of the toes of the opposite foot, and twisting them. This renders the iguana helpless. In Panama City one may see dozens of them lying in the street of the market place. I am told that in Venezula the natives simply break the iguana's back to keep it more or less immobile.

I do not recall having heard an iguana voice a sound of any kind. However some of the mestizos who worked for me told me of an occasion in which an iguana caused much excitement among the sight seers who flocked off a boat at Cristobal. The big lizard, held by a Panamanian, made lots of peculiar noises, whistled and "talked." An excited gringo thought that he had made a wonderful discovery for some zoo, and convinced the Panamanian to part with it for the measly sum of $10.00. Of course it was a trick of ventriloquy.

R. F. D. No. 2, Polk Pennsylvania.

Variation in the Scale and Color Pattern of the Wandering Garter Snake, In Utah and Southern Idaho

By Wilmer W. Tanner

A series of 363 specimens of the Wandering Garter Snake, *Thamnophis elegans vagrans* (B. & G.), from southern Idaho and Utah shows certain local and geographic variations not listed by Fitch in his study of the "Ordinoides Artenkreis of Garter Snakes" in 1940.

The diagnosis as given by Fitch (1940) covers the general characters of *vagrans* quite completely and it is not intended in this study to attempt a modification of any diagnostic characters. It is evident from the summarized data listed below that the characters listed by Fitch might have been obtained as easily from this series as from the series he used.

Considering the size of the series and that it has been brought together from such a centrally located position in the geographical range of *vagrans,* it is not surprising to find a few variations not noted before. The majority of the specimens used in this report are now in the Brigham Young University Herpetological Collection.

The summarized scale variations are as follows: ventrals 150-180; subcaudals 68-95; scale rows usually 21-21-17, but with 21-21-19, 21-19-17, and 19-21-17 occurring rather frequently. Eighty-one per cent possess 21 rows at some points on the anterior third of the body and 17 rows at or before the vent. Supralabials 7, 8, or 9: 89 per cent with 8; 9.2 per cent with 7; and 1.8 per cent with 9. Infralabials 9, 10, or 11: 83.75 per cent with 10; 11.87 per cent with 9 and 4.38 per cent with 11. Preoculars 1 or 2, 97 per cent with one. Postoculars 2, 3, or 4: 57.92 per cent with 3; 39.16 per cent with 4 and 2.92 per cent with 2. Temporals 1-2 or 1-3, 86.8 per cent with 1-2. The anal scute is usually single.

The itensity of the color is more variable than is the color pattern. The average specimen is drab or olive-brown, with two lateral and one dorsal cream-colored stripes. In recently molted individuals the skin between the dorsal scales is bright yellow. The dorsal stripe is invaded and at times broken by small dark spots. The ventrals may have a ground color of either cream or straw, flecked or marbled with brown or black. The dark colors are more predominant on the tail and the posterior portion of the body. An occasional specimen is melanistic to the point of obscuring the stripes, whereas a single specimen from Bryce Canyon National Park is light cream color flecked with numerous small dark spots, and with only traces of yellow visible between the lateral scales.

Adult females are, on the average, larger than males. The largest female examined is 923 mm. in total length and the tip of the tail is missing. This amazingly large specimen was taken at the forks of Huntington and Boulger Creeks, Emery Co., Utah, August 9, 1950. When found it was in the process of feeding on an adult *Bufo b. boreas*. The largest male measures 715 mm. The percentage of tail into total length varies between 21-28: in females 21-26, average 23.62; in males 22.3-27.9, average 25.59.

The number of postoculars appears to be correlated with geography and varies on a north-south axis. The series from southern Idaho contain a high percentage of specimens with 3 postoculars, a condition considered to be normal for the subspecies. In this series only 9.4 per cent of the specimens have a postoular count of 2 or 4 scales, and in such exceptions the even number is usually present on only one side, the other side showing the normal, 3 scales. Specimens collected at localities progressively father south of the Utah-Idaho border show a steady increase in the number of postoculars. The increase occurs mainly by adding an extra scale on only one side to produce a formula of 3-4; however, specimens having a formula of 4-4 do occur in northern Utah. Both formulas (3-4 and 4-4) become progressively more common to the south. The following chart indicates the clinal variation.

Postocular Variations

Localities	*Number of specimens*	*Percentage with 2*	*Percentage with 3*	*Percentage with 4*
All specimens studied	363	2.92	57.92	39.16
Southern Idaho	32	4.69	90.62	4.69
Northern Utah	18	5.55	66.67	27.78
Provo (Utah County)	30	0.00	63.33	36.67
Utah County	42	1.20	58.33	40.47
Southeastern Utah	80	1.25	38.13	60.62

LIBRARY MAY 6 1954 MANHATTAN KANSAS

Specimens examined from the great basin area southwest of Utah County show a ratio similar to that occurring in the series from Utah County. A small series from the northeastern part of the state (Carbon, Duchesne and Uintah Counties) have approximately an equal number of specimens with 3 and with 4 postoculars. This increase in the frequency of 4 scale is probably because of the close contact with the population to the south.

An isolated population of snakes inhabiting a marsh on the eastern edge of Provo, Utah, has a high percentage of divided anal scutes. The variation was first observed by Mr. A. Kent Christenson under rather unusual circumstances during late March in 1943. Mr. Christenson visited the area before the snakes had begun their spring emergence and quite by chance dug into the loose sandy soil at the base of an old willow stump. After digging down for approximately 8 inches he was surprised to uncover what proved to be a large aggregation of hibernating *vagrans*. Seventy-six specimens were removed, of which 24 had a divided anal.

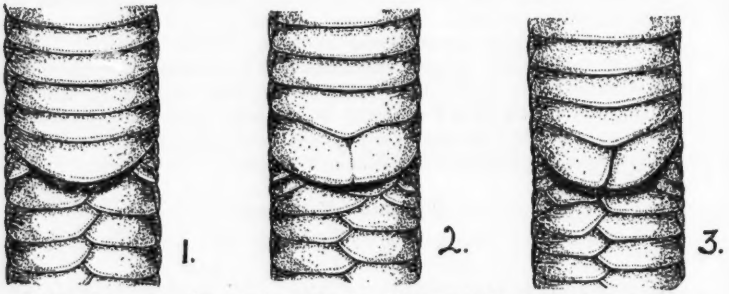
In April, 1945, we collected a series of 44 snakes from the marsh area, and of this series 14 had a divided anal scute.

During the past summer I collected a small series from the marsh area, however, it should be noted that the City of Provo has expanded into the marsh area and has reduced the population considerably. In spite of these conditions, 12 speciments, two with a divided anal, were found during the past summer.

The following chart indicates the extent of the variation:

Anal Scale Variations

Localities	*Per cent with divided anal*
All specimens studied (except marsh)	5.35
Utah County (exclusive of marsh)	8.00
North, west and south edges of Provo	10.10
Marsh area (east Provo)	30.30



Comparison of the anal scale in *Thamnophis elegans vagrans* (Baird & Girard). Fig. 1, The normal scale. Fig. 2, The grooved scale. Fig. 3, the divided scale. The three specimens were collected from the marsh area.

It should be noted that unsuspecting or amateur workers would, by using the standard keys available, key all individuals having a divided anal scute to the genus *Natrix*. The presence of such genetic variations in segments of a large population indicate the importance of large and widely collected series, before the variations within a subspecies can be determined accurately.

LITERATURE CITED

Fitch, H. S. 1940. A biogeographical study of the Ordinoides Artenkreis of garter snakes (genus Thamnophis). Univ. Calif. Publ. Zool., 44: 1-150.

Fitch, H. S. 1948. Further remarks concerning *Thamnophis ordinoides* and its relatives. Copeia, 1948: 121-126.

Fox, Wade. 1948. The relationships of the garter snake *Thamnophis ordinoides*. Copeia, 1948: 113-120.

Tanner, W. W. 1949. Food of the wandering garter snake, *Thamnophis elegans vagrans* (Baird & Girard), in Utah. Herpetologica, 5: 85-86.

Brigham Young University, Provo, Utah

A Case of Poisoning from the Bite of a Coral Snake, Micrurus f. tenere Baird and Girard

By John E. Werler and Donald M. Darling

Few cases of coral snake bite have to date been placed on record and scarcely any of these are accompanied by specific details of symptoms observed or results of treatment administered. Especially is this true of the western form, *Micrurus f. tenere,* which evidently has been the cause of fewer accidents than has its eastern congeners.

Stejneger (1895) mentions two cases of poisoning by *tenere* in Texas, one of which ended fatally. Gloyd (1938) relates a detailed account of a bite involving a melanistic coral snake of the same species and gives a complete history of the case, which terminated with full recovery of the victim. The following is the first report of poisoning by a coral snake in Texas which has come to our attention in three years, and Col. Crimmins, who diligently has been accumulating reports and case histories of snake bite in the state for several decades, has heard of no additional cases in the past ten years.

The following case history is compiled almost entirely from information supplied by Dr. John F. Perry, Jr., attending physician. This is supplemented by a verbal account of symptoms, volunteered by the patient after his release from the hospital, and also from observations on the victim made by one of us (Werler) from 9 p.m., May 14 (half-hour after patient's arrival at the hospital) until nearly 3:30 a.m. May 15.

The patient, Mr. C. J., a 36-year-old white male from San Antonio, Texas, was first seen at the Santa Rosa Hospital on May 14, 1950, at which time he gave the following account of the accident:

Earlier, on the same date he had picked up an unidentified snake and placed it in the glove compartment of his car to take home to his children who were studying elementary biology in school. He arrived home at about 7:30 p.m. He removed the snake from the glove compartment and, while handling it, the snake bit him at the base of the right index finger. The snake bit him for only a very short period of time and he rapidly withdrew his hand. During the following hour a severe pain developed in the palm of the hand, which soon radiated up the arm. This was of such severity that it brought him to the hospital seeking relief within an hour after the accident. The patient was given morphine grs. ¼, as soon as he was seen in the emergency room by the house physician, but this did little to relieve the pain in the palm of the hand. He described the pain in his hand as "burning" in character, as though a coal of fire were in the palm.

The patient had brought with him to the hospital the snake which caused the bite. However, until we arrived at 9 p.m. to identify the specimen, there was still some doubt as to the venomous nature of his injury. As a result, all-out treatment had been delayed but immediately thereafter, full-scale treatment was instituted.

Specific treatment consisted of applying a tourniquet to the forearm, after which numerous crucial incisions were made, first over the wound itself and then over the back and palm of the hand, suction being applied intermittently to these with snake bite suction cups. The tourniquet was applied only tightly enough to control the lymphatic flow from the extremity, and was loosened periodically for short periods of time. The area covered by the incisions was gradually extended to include the forearm, as well as the hand, and these were carried as high as the elbow. Suction was applied in this manner for approximately three hours, during which time the patient was given two pints of whole blood intravenously.

During this three hour period the patient was quite somnolent, although periodically complaining of a burning pain in the palm of the hand, which, during greatest intensity, extended up the arm to the elbow. These pains occurred rhythmically at intervals of approximately four or five minutes, lasting only from thirty seconds to a minute. The pulse was rapid and of good volume, the skin cold, and perspiration profuse. By about 11:30 p.m. the patient's general condition had improved considerably. He was then moved from the emergency room to a hospital room and thereafter, through the course of the night, hot packs were applied intermittently to the arm, alternating these with suction to the crucial incisions for periods of thirty minutes. At 11:35 p.m. the patient experienced some diffculty in breathing, which continued for seven or eight minutes. There was no subsequent recurrence of this symptom. An additional 500 c.c.'s of whole blood wa administered at this time, as well as one 15 c.c. unit of Antivenin (Nearctic Crotalidae). No serum for use in coral snake bites was available at the time in this part of the country.

On the following day, May 15, the patient was considerably improved. He was wide awake and the skin was warm and dry. Temperature 98; pulse 92; respirations 22. He complained of a sore throat, difficulty in swallowing, soreness of the eyes and conjunctivae, and general soreness of the skin, most marked on the forehead. The local reaction in the forearm was no greater than one would expect from the incisions made in the treatment. General condition appeared good. There was no inflammation of the pharynx or eyes to explain his complaint of soreness.

On May 16 the same symptoms were present but much less severe. The patient was able to swallow with much less difficulty. His general condition appeared very good. The arm and hand were slightly swollen but there was no evidence of infection.

After discharge from the hospital, the patient was examined periodically at Dr. Perry's office, during which time the numerous

crucial incisions healed very rapidly and without any evidence of infection. He subsequently was dismissed without any residual symptoms.

Dr. Perry's summary of the case is as follows: "Whether or not the respiratory depression and evidence of peripheral vascular collapse, which this patient evidenced in the early part of his illness following the bite, were the result of the coral snake venom, is not known. It is possible that the respiratory depression which he demonstrated may have been due to the morphine, or it may have been due to the neurotoxic effect of the venom. I do not believe the patient received sufficient opiates to cause the degree of respiratory depression which he exhibited. At no time was the arm or hand badly swollen, nor was there any progression of swelling up the arm, as occurs in bites of rattlesnakes. The sore throat, soreness of the skin, and conjunctival irritation seem to have been results, specifically, of the coral snake venom. Coral antivenom was available approximately twenty-four hours after the patient had been bitten. However, at this time his general condition was very good, and we did not feel that its use was then warranted. Whole blood was administered in treatment to compensate for the loss of blood and serum which occurred as a result of the crucial incisions over his arm, and also as a general supportive measure. His recovery was complete, and there were no residuals or sequelea. At no time was his temperature greater than 99.8, this having occurred only once, on May 16. The remainder of the time his temperature was of a normal value."

Symptoms as reported by Gloyd (1938) in the case of poisoning by a melanistic coral snake, generally parallel those reported in the foregoing case, and although we are in no position to venture any authoritative opinion, it seems reasonable to assume these are the direct or indirect results of the venom: (1) Severe cyclic pains in the vicinity of the bite. (2) Soreness about the face and throat. (3) Profuse perspiration.

There is still much doubt in some quarters, despite recorded fatalities, that the bite of *Micrurus fulvius* is, in most cases, very serious. This is demonstrated by the careless disregard with which a number of amateur herpetologists and snake handlers in the state fondle these snakes. The victim of the aforementioned accident fortunately received only a poor bite, although a more prolonged bite by a coral snake of this size (the snake measured 795 mm.), might well have meant the death of the patient.

LITERATURE CITED

Gloyd, H. K. 1938. A case of poisoning from the bite of a black coral snake. Herpetologica, 1: 121-124, 1 pl.

Stejneger, L. 1895. The poisonous snakes of North America. Report U. S. Nat. Mus., 337-487, pls. 1-19, figs. 1-70.

San Antonio Zoological Society, San Antonio, Texas

Some Noteworthy Records of Amphibians And Reptiles In Tennessee

By Ralph Mason Sinclair

Recent collecting by the author in the western half of the state of Tennessee has revealed two subspecies not previously recorded for the state, and has thrown new light on the zoogeographic importance of the East Gulf Coastal Plain. Notes on these new records follow.

U.S. DEPT. OF AGRICULTURE AND APPL. LIBRARY MAY 6 1954 MANHATTAN ILLIS KANS.

Plethodon glutinosus grobmani Allen and Neill
Grobman's Slimy Salamander

The recent description of *Plethodon glutinosus grobmani* (Allen and Neill, 1949) has been compared with series of live Slimy Salamanders taken on June 29 and 30, 1950 from Shelby Forest State Park, Shelby County, Tennessee. These live specimens agree remarkably well with the original description. The series was collected in climax forests of beech and oak. This record from Tennessee is well over 400 miles from the known range of *Plethodon glutinosus grobmani* and may imply that the range of this salamander is discontinuous. Possibly additional collecting and observations upon live specimens will show that it is found in other localities within the East Gulf Coastal Plain, but the presence of *Plethodon glutinosus glutinosus* (Green) in western Georgia (cf. Allen and Neill) does not strengthen this possibility. Much additional study of specimens from intervening areas will be necessary to satisfactorily account for the extraordinary distribution.

A series of nine averaged 51.5 mm. snout to vent length with extremes of 65 mm. and 38 mm. All had scattered dots of a metallic golden color on the back, few to many very small golden spots on the dorsum of the head, and lateral spots lichenous and not in sharp contrast to the ground color. Five had 14 and three had 13 costal grooves each with an imperfect developed one in the groin.

Specimens from Shelby and Henderson Counties were reported in Herpetologica (Sinclair, 1950) as *Plethodon g. glutinosus* (Green). The specimen from Shelby County is now considered to be *grobmani*. The Henderson County specimen had the white markings confined to the sides of the head, trunk, and tail and thus resembles the Slimy Salamander from the upper coastal plain of Georgia.

Pituophis melanoleucus mugitus Barbour. Florida Pine Snake.

The range of this snake is given by Stull (1940, p.66) as Florida and extreme southern Georgia. The Common Pine Snake, *Pituophis melanoleucus melanoleucus* Daudin, is recorded from east Tennessee, and is very unlikely to occur west of the Cumberland Plateau. Accordingly a single specimen of *Pituophis melanoleucus*

mugitus collected at Natchez Trace State Park, Henderson County, Tennessee, is of unusual geographic importance. It was secured by Ernest Haskins on July 12, 1950, and is now in the collection of Shelby Forest State Park Museum. This specimen in life had a dusty tan ground color with a somewhat lighter color on the sides. The venter and first two scale rows were a cream color. Dorsal blotches of a dark brown color numbered 17 on the posterior two-thirds of the body, becoming indistinct anteriorly. The sides of the body on the posterior two-thirds were marked with blotches of a lighter brown color than those on the dorsum. The venter had a few small dark brown blotches on the posterior two-thirds of the body and continued on the tail. Scale row formula 27-29-21; upper labials 8; combined ventrals and subcaudals 272; total length 1,234 mm.; tail length 160 mm. This agrees with Barbour (1921) who describes *pituophis m. mugitus* as being rusty brown, and having a higher scale row and combined ventral and subcaudal count than *Pituophis m. melanoleucus*.

The Tennessee locality is so distant from others recorded for the species that the possibility of human transportation must be considered. I regard the possibility remote since the Florida Pine Snake is fairly common at Natches Trace State Park, where the natives call it a bull snake. The present record suggests that as in the case of *Plethodon g. grobmani* the range of this form is either highly discontinuous or as seems more probable the subspecies occurs throughout the apparent hiatus and has never been collected or recognized.

Pseudotriton ruber (Sonnini). Red Salamander.

Mittleman (1946) gives a record for *Pseudotriton ruber vioscai* in the East Gulf Coastal Plain (Hardeman County, Tennessee) and a record for *Pseudotriton ruber ruber* in the Interior Low Plateau Province (Wayne County, Tennessee). These two records are scarcely 70 miles apart, and no signs of intergradation toward one or the other were evident. Recently a specimen of *Pseudotriton ruber vioscai* from Henderson County, Tennessee, reported in Herpetologica (Sinclair, 1950) and a specimen which is apparently in intergrade between *Pseudotriton r. ruber* and *Pseudotriton r. vioscai* collected by the author May 14, 1950, at Montgomery Bell State Park, Dickson County, Tennessee, have thrown new light on this subject. The locality for this intergrade is within the Interior Low Plateau Province and is 39 miles east of the Tennessee River and 75 miles northeast of the *Pseudotriton r. vioscai* in Henderson County. Whether typical *Pseudotriton r. vioscai* is found east of the Tennessee River remains to be seen.

I am grateful to Dr. Hobart M. Smith for his helpful suggestions and criticisms in reviewing these notees in manuscript form.

LIBRARY MAY 6 MANHATTAN KANSAS

LITERATURE CITED

Allen, E. Ross, and Wilfred T. Neill. 1949. A new subspecies of salamander (genus *plethodon*) from Florida and Georgia. Herpetolgica, 5:112-114.

Barbour, Thomas. 1921. The Florida Pine Snake. Proc. New Engl. Zool. lub, 7:117-118.

Mittleman, M. B. 1946. Notes on some Tennessee salamanders of the genus *Pseudotriton*. Nat. Hist. Misc., 4:1-3.

Sinclair, Ralph M. 1950. Notes on some salamanders from Tennessee. Herpetologica, 6:49-51.

Stull, Olive E. 1940. Variations and relationships in the snakes of the genus *pituophis*. Bull. U. S. Nat. Mus., 175 :i-vi 1-225, figs. 1-84, tables 1-14.

Shelby Forest State Park, Lucy, Tennessee

AGRICULTURE AND APPLIED SCIENCE LIBRARY MAY 6 1954 KANSAS STATE COLLEGE MANHATTAN KANSAS

The Saw-Scaled Viper in Captivity

During July of this year, two specimens of the saw-scaled or carpet viper, *Echis carinatus* (Schneider) were received in a mixed collection of reptiles from Europe. These particular vipers had been collected, as far as is known, in the Peoples Republic of Azerbaidzhan, U. S. S. R. Since this species is rather rare in collections, the following observations may prove of interest.

The two specimens in my possession live up to their reputation for having an ugly disposition. If disturbed while prowling around their cage, they immediately coil and begin the lateral undulations that cause the serrated scales to rub against each other, thus producing a harsh, rasping sound. The head and neck are raised a few inches above the cage floor and the mouth opened. If aggravated further, they strike with amazing force and rapidity, then return to the original position. At times, they will "jump" or throw themselves off the ground when striking.

Judging from the large eyes and the hours of prowling, I should say that they are semi-nocturnal. Except for the hours of early morning and the early and late hours of the evening, they remain in the retreat provided for them. If not kept rather warm (75 F.), they become rather sluggish and noticeably darker in color. Prior to ecdysis, the color becomes very dark, brownish-black. The ground color is normally a light tan. Ecdysis is quite frequent, the larger specimen having shed four times to date, (September 28) and showing a marked increase in length.

While in Europe, these specimens fed on "various lizards," (probably Lacertids) readily. Since their arrival here, they have fed quite readily on small mice. These are preferred alive, but they will sometimes accept a freshly killed one after investigating it thoroughly. They are quite active in feeding, chasing the prey and grabbing it with a rapid dart of the head. The food animal is seldom released, ingestion starting almost immediately, the victim usually being dead within forty seconds.

—J. M. Mehrtens, 74 Eldert St., Brooklyn, New York City

END Vol. VI

HERPETOLOGICA

Volume 6 1950

INDEX

STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE
LIBRARY
MAY 7 1954
MANHATTAN KANSAS

Compiled By

CHARLES E. SHAW

Compiled by Charles E. Shaw

Acris gryllus crepitans, 139-140
gryllus, 139-140
acutus, Crocodylus, 96
aestivus, Opheodrys, 116
adamanteus, Crotalus, 96
affinis, Pituophis catenifer, 9
Agkistrodon, 84
contortrix contortrix, 96
mokeson, 88
piscivorus piscivorus, 96
alleni, Liodytes, 13, 48
Liodytes alleni, 14-16
Alligator mississipiensis, 96
Ambystoma annulatum, 55
maculatum, 49, 132
opacum, 49
texanum, 49, 70
tigrinum, 74
mavortium, 5
tigrinum, 49
Ameiva undulata pulchra, 55
Amphiuma, 128, 131
means, 116
Amyda, 139
anguineus, Proteus, 82
angulifer, Epicrates, 96
Anolis carolinensis carolinensis, 115
tropidonotus, 55
Anomalodon, 52
annulatum, Ambystoma, 55
Arizona elegans elegans, 112
philipi, 3, 9
arnyi, Diadophis punctatus, 92
assata, Scincella assata, 20
atricaudatus, Crotalus horridus, 96
atrox, Crotalus, 3, 10, 44
baileyi, Crotaphytus collaris, 3, 7, 89
barbouri, Sistrurus miliarius, 96
beddomei, Scincella, 20
beldingi, Cnemidophorus hyperythrus, 36
biseriatus, Sceloporus occidentalis, 31, 32, 36, 41
bislineata, Eurecea, 130
bombifrons, Spea, 75
boreas, Bufo boreas, 195
brunnea, Hyla dominicensis, 26
brevirostre, Phyrnosoma douglassii, 34
Bufo boreas boreas, 195
cognatus, 1, 3, 5, 75
insidior, 5
punctatus, 3, 5, 40, 75
terrestris terrestris, 114, 115
woodhousii fowleri, 114
cahuilae, Leptotyphlops humilis, 12
Caiman, 96
Callisaurus draconoides gabbii, 36
Caretta caretta caretta, 23
caretta, Caretta caretta, 23
Caretta caretta gigas, 23
carinatus, Echis, 202
carolina, Terrapene carolina, 116
carolinensis, Anolis carolinensis, 115
Microhyla carolinensis, 21
catesbeiana, Rana, 89, 114, 115, 116
Cemophora coccinea, 115
cenchris, Epicrates, 96
chalconota, Hyla, 25
cherriei, Scincella cherriei, 20
cinereus, Plethodon, 130, 133
Plethodon cinereus, 81
Sphaerodactylus, 21, 22, 60, 62, 64
cirrigera, Eurycea bislineata, 50
Cnemidophorus grahamii, 30, 90, 91
gularis octolineatus, 91, 92
hyperythrus beldingi, 36
lemniscatus lemniscatus, 55
perplexus, 3, 7, 91, 92
sexlineatus, 30, 91
tesselatus, 3, 7, 30, 90, 91
tigris tigris, 3, 4, 5, 7
coccinea Cemophora, 115
cognatus, Bufo, 1, 3, 5, 75
Coleonyx variegatus variegatus, 36
Coluber, 84
constrictor flaviventris, 88, 122, 124
mormon, 45, 59
flagellum flagellum, 59
taeniatus taeniatus, 67
concinnus, Thamnophis sirtalis, 97
consobrinus, Sceloporus undulatus, 3, 5
confinis, Elaphe obsoleta, 42
Constrictor, 84
constrictor constrictor, 86, 87, 96
imperator, 96, 191
constrictor, Constrictor constrictor, 86, 87, 96
Contia tenuis, 116
contortrix, Agkistrodon contortrix, 96
coriacea, Dermochelys, 23
cornutum, Phrynosoma, 3, 7, 28
couchii, Scaphiopus, 75
couperi, Drymarchon corais, 35
cowlesi, Uma notata, 36
crepitans, Acris gryllus, 139, 140
Crocodylus acutus, 96
Crotalus, 84
adamanteus, 96
atrox, 3, 10, 44
horridus atricaudatus, 96
molossus molossus, 3, 10
viridis lutosus, 45, 67
viridis, 5, 10, 34, 96
Crotaphytus, 2, 78
collaris baileyi, 3, 7, 89
wislizenii wislizenii, 3, 5, 7
crucifer, Hyla, 74

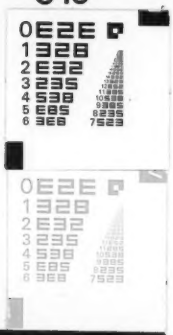
Cryptobranchus, 126, 132
Cyclodina, 18
cyrtopsis, Thamnophis eques, 9, 39, 93
Deirochelys reticularia, 137
dekayi, Storeria, 102
Dendrohyas septentrionalis, 24, 25
Dermochelys coriacea, 23
deserticola, Hypsiglena ochrorhyncha, 45, 46
Hypsiglena torquata, 13
Pituophis catenifer, 45, 67, 120
Salvadora hexalepis, 3, 9
Desmognathus, 130
fuscus, 133
fuscus, 49, 50
quadrimaculata, 130, 133
Diadophis, 2, 29
punctatus arnyi, 92
regalis regalis, 10, 45
dissecta, Leptotyphlops dulcis, 29
dominicensis, Hyla, 24
dorsalis, Plethodon, 50
Drymarchon corais couperi, 35
erebennus, 35
dulcis, Leptotyphlops dulcis, 29
Echis carinatus, 202
Elaphe, 84
guttata guttata, 113, 115, 116
laeta laeta, 55
obsoleta, 109, 110, 111
confinis, 42
obsoleta, 42, 102, 115
quadrivittata, 110, 111
rossalleni, 109-112
subocularis, 3, 9
elegans, Arizona elegans, 112
Scincella, 19
Sphaerodactylus, 60, 62, 64
elongatus, Sceloporus undulatus, 31
Epicrates angulifer, 96
cenchris, 96
episcopa, Sonora episcopa, 29
erebennus, Drymarchon corais, 35
erythrogaster, Natrix erythrogaster, 115, 116
Eulepis, 18
Eumeces anthracinus pluvialis, 53
fasciatus, 53
inexpectatus, 116
laticeps, 53, 115, 116
multivirgatus, 90
obsoletus, 3, 7, 29
obsoletus, 53
septentrionalis septentrionalis, 53
Eurecea bislineata, 130
multiplicata, 130, 133
Eurycea bislineata cirrigera, 50
rivicola, 50
longicauda guttolineata, 50
longicauda, 50
lucifuga, 50
multiplicata, 27, 28
fasciatus, Eumeces, 53
flagellum, Coluber flagellum, 59
flavescens, Kinosternon flavescens, 94, 138, 139
flavilineata, Tantilla, 117-119
flaviventris, Coluber constrictor, 88, 122, 124
forbesorum, Scincella, 20
formosum, Leiolopisma, 19
fowleri, Bufo terrestris, 114
fuscus, Desmognathus, 133
Desmognathus fuscus, 49, 50
gabbii, Callisaurus draconoides, 36
gadovii, Microhyla usta, 21
Gambelia wislizenii wislizenii, 89
gemmingeri, Scincella, 20
gentilis, Lampropeltis triangulum, 41, 67
geographica, Hyla, 24
gigas, Caretta caretta, 23
glutinosus, Plethodon glutinosus, 50, 200
graciosus, Sceloporus graciosus, 33
Urosaurus, 36
grahamii, Cnemidophorus, 30, 90, 91
grobmani, Plethodon glutinosus, 200, 201
gryllus, Acris gryllus, 139, 140
guichenoti, Lygosoma, 18
guttata, Elaphe guttata, 113, 115, 116
guttolineata, Eurycea longicauda, 50
Haldea valeriae valeriae, 116
hammondii, Scaphiopus, 3, 5, 76
Spea, 76, 77
haydenii, Thamnophis radix, 93
Heloderma suspectum, 37
Hemidactylum, 130, 133
Hemidactylus turcicus turcicus, 22
hernandesi, Phrynosoma douglassii, 39
hesperis, Uta stansburiana, 36
Heterodon, 5, 52, 84
madagascariensis, 52
nasicus kennerlyi, 10
platyrhinos platyrhinos, 116
hippocrepis, Kinosternon subrubrum, 139
holbrooki, Scaphiopus **holbrooki, 114**
Holbrookia, 2
texana, 7
Homalocranium sexfasciata, 119
Hombronia, 18
Hyla, 26
chalconota, 25
crucifer, 74
dominicensis, 24
brunnea, 26
dominicensis, 26
insulsa, 26

geographica, 24
insulsa, 26
marmorata, 26
septentrionalis, 24-26
septentrionalis, 20
squirella, 115
Hypsiglena ochrorhyncha deserticola, 45, 46
torquata deserticola, 13
nuchalata, 29
texana, 28
Iguana iguana iguana, 187-193
iguana, Iguana iguana, 187-193
Iguana iguana rhinolopha, 55
imperator, Constrictor constrictor, 96, 191
incertum, Scincella, 20
inexpectatus, Eumeces, 116
inconspicuum, Scincella, 19
insidior, Bufo, 5
insulsa, Hyla, 26
Hyla dominicensis, 26
insulsus, Trachycephalus, 26
ixbaac, Scincella cherriei, 20
jani, Tantilla, 119
kennerlyi, Heterodon nasicus, 10
Kinosternon flavescens flavescens, 94, 138, 139
subrubrum hippocrepis, 138, 139
subrubrum, 116
laeta, Elaphe laeta, 55
laetus, Scotophis, 55
Lampropeltis getulus splendida, 9
yumensis, 13
pyromelana, 45
triangulum gentilis, 41, 67
Lampropholis, 17-20
laterale, Leiolopisma, 17, 53
Scincella, 20
lateralis, Scincus, 17, 19
laticeps, Eumeces, 53, 115, 116
lecontei, Rhinocheilus, 46
Rhinocheilus lecontei, 45
Leiolopisma, 17-20
formosum, 19
laterale, 17, 53
telfairii, 17
lemniscatus, Cenmidophorus lemniscatus, 55
Leptotyphlops dulcis dulcis, 29
dissecta, 29
humilis cahuilae, 12
segrega, 9
lineapiatus, Liodytes alleni, 13
linearis, Sonora semiannulata, 12
Urosaurus ornatus, 5
lineatum, Tropidoclonion, 93
Liodytes, 13
alleni, 13, 48
linneapiatus, 13
Lioheterodon, 52
Lioscincus, 18
Lipinia, 18, 19
pulchella, 18
vulcanium, 19
longicauda, Eurycea longicauda, 50
lucifuga, Eurycea, 50
lutosus, Crotalus viridis, 45, 67
Lygosoma, 17-19
guichenoti, 18
semperi, 19
Lygosomella, 18
mabouya, Mabuya mabouya, 55
Mabuya mabouya mabouya, 55
macrospilota, Malaclemys terrapin, 22
maculatum, Ambystoma, 49, 132
maculosa, Salamandra, 128
maculosus, Necturus maculosus, 49
madagascariensis, Heterodon, 52
magister, Sceloporus magister, 3, 5
Malaclemys terrapin macrospilota, 22
rhizophorarum, 22
Manculus, 133
marginatus, Stereochilus, 135
marmorata, Hyla, 26
marmoratus, Trachycephalus, 25
Masticophis flagellum piceus, 13
testaceus, 3, 5, 9
taeniatus taeniatus, 3, 9, 45
mavortium, Ambystoma, tigrinum, 5
means, Amphiuma, 116
megalops, Thamnophis subcarinatus, 40
melanoleucus, Pituophis melanoleucus, 200, 201
Microhyla carolinensis carolinensis, 21
olivacea, 21, 47
olivacea, 75
usta usta, 21
gadovii, 21
Micrurus fulvius tenere, 197-199
miotis, Scincella, 19
mississipiensis, Alligator, 96
Mocoa, 18
modestum, Phrynosoma, 3, 7
mokasen, Agkistrodon contortrix, 88
molossus, Crotalus molossus, 3, 10
mormon, Coluber constrictor, 45, 59
mugitus, Pituophis melanoleucus, 200, 201
multiplicata, Eurecea, 130, 133
multiplicata, Eurycea, 27, 28
Spea, 76, 77
multiplicatus, Spelerpes, 27
multivirgatus, Eumeces, 90
Naja nivea, 35
Natrix, 196

LIBRARY MAY 7 1951 KANSAS

erythrogaster erythrogaster, 115, 116
sipedon pictiventris, 59
sipedon, 57, 59
Necturus, 126, 128, 131
maculosus maculosus, 49
nigrolateris, Thamnophis marcianus, 40
nitens, Scincella, 19
nivea, Naja, 35
notata, Uma notata, 36
notatus, Sphaerodactylus, 4, 22
nuchalata, Hypsiglena torquata, 29
obsoleta, Elaphe, 109, 110, 111
Elaphe obsoleta, 42, 102, 115
obsoletus, Eumeces, 3, 7, 29
Eumeces, obsoletus, 53
occidentalis, Sceloporus, 31
octolineatus, Cnemidophorus gularis, 91, 92
odoratus, Sternotherus, 95
Oligosoma, 18
olivacea, Microhyla, 75
Microhyla carolinensis, 21, 47
opacum, Ambystoma, 49
Opheodrys aestivus, 116
Ophisaurus ventralis ventralis, 115
ordinoides, Thamnophis, 97, 98, 100
ornata, Terrapene, 3, 10, 54
palnica, Scincella, 20
parietalis, Thamnophis ordinatus, 85, 87, 88, 120
parkeri, Sphaerodactylus, 107-108
perplexus, Cnemidophorus, 3, 7, 91, 92
philipi, Arizona elegans, 3, 9
Phrynosoma, 34
cornutum, 3, 7, 28
douglassii brevirostre, 34
hernandesi, 39
modestum, 3, 9
pickeringii, Thamnophis sirtalis, 59
pictiventris, Natrix sipedon, 59
pipiens, Rana, 74
piscivorus, Agkistrodon piscivorus, 96
Pituophis, 2, 84
catenifer affinis, 9
deserticola, 45, 67, 120
sayi 9, 88
melanoleucus melanoleucus, 200, 201
mugitus, 200, 201
platyrhinos, Heterodon platyrhinos, 116
Plethodon cinereus, 82, 130, 133
cinereus, 81
dorsalis, 50
glutinosus glutinosus, 50, 200
grobmani, 200, 201
pluvialis, Eumeces anthracinus, 53
poinsettii, Sceloporus, 80, 81
porphyriticus, Gyrinophilus
porphyriticus, 50
Proteus anguineus, 82
Pseudacris nigrita triseriata, 74
Pseudemys, 139
Pseudotriton ruber, 201
ruber, 50, 74, 201
vioscai, 50, 201
pulchra, Ameiva undulata, 55
pulchrum, Scincella, 19
punctatus, Bufo, 3, 5, 40, 75
pyromelana, Lampropeltis, 45
Python reticulatus, 96
sebae, 96
quadrimaculata, Desmognathus, 130, 133
quadrivittata, Elaphe obsoleta, 110, 111
radix, Thamnophis, 70
Rana catesbeiana, 89, 114, 115, 116
pipiens, 74
sylvatica, 74
rapicaudus, Thecadactylus, 55
regalis, Diadophis regalis, 10, 45
reticularia, Dierochelys, 137
reticulatus, Python, 96
Rhinocheilus lecontei, 46
lecontei, 45
tessellatus, 3, 9, 112
tesselatus, 92
rhinolopha, Iguana iguana, 55
rhizophorarum, Malaclemys terrapin, 22
rivicola, Eurycea bislineata, 50
rossalleni, Elaphe obsoleta, 109-112
ruber, Pseudotriton ruber, 50, 74
rufipunctatus, Thamnophis, 40
Salamandra, 126
maculosa, 128
Salamandrella, 126, 132
Salvadora, 3
hexalepis deserticola, 3, 9
Sauroscincus, 18
sayi, Pituophis catenifer, 9, 88
Scaphiopus, 5
couchii, 75
hammondii, 3, 5, 76
holbrookii holbrookii, 114
Sceloporus, 29
graciosus graciosus, 33
magister magister, 3, 5
occidentalis, 31
biseriatus, 31, 32, 36, 41
poinsettii, 80, 81
undulatus, 31
consobrinus, 3, 5
elongatus, 31
tristichus, 31, 32
Scincella, 19, 20
assata assata, 20
taylori, 20
beddomei, 20

cherriei cherriei, 20
ixbaac, **20**
stuarti, **20**
elegans, **19**
forbesorum, **20**
gemmingeri, 20
incertum, 20
inconspicuum, 19
laterale, 20
miotis, 19
nitens, 19
palnica, 20
pulchrum, 19
semoni, 19
silvicolum, 20
stanleyanum, 19
subnitens, 19
textum, 19
travankorica, 20
Scincus lateralis, 17, 19
Scotophis laetus, 55
sebae, Python, 96
segrega, Leptotyphlops humilis, 9
semoni, Scincella, 19
semperi, Lygosoma, 19
septentrionalis, Dendrohyas, 24, 25
Eumeces septentrionalis, 53
Hyla, 24-26
Hyla septentrionalis, 20
sexfasciata, Homalocranium, 119
sexlineatus, Cnemidophorus, 30, 91
silvicolum, Scincella, 20
sipedon, **Natrix sipedon**, 57, 59
Siren, 13, 126, 128, 131
sirtalis, Thamnophis, 99, 100
Thamnophis sirtalis, 70, 73
Sistrurus, **84**
catenatus tergeminus, 94
miliarius barbouri, 96
Sonora episcopa episcopa, 29
semiannulata linearis, 12
Spea **bombifrons, 75, 76**
hammondii, **76, 77**
multiplicata, 76, 77
Spelerpes multiplicatus, 27
Sphaerodactylus cinereus, 21, 22, 60, 62, 64
elegans, 60, 62, 64
intermedius, 62, 63
notatus, 21
parkeri, **107, 108**
splendida, Lampropeltis getulus, 9
squirella, Hyla, 115
stanleyanum, Scincella, 19
stejnegeri, Uta stansburiana, 3, 5, 34, 36
Stereochilus marginatus, 135
Sternotherus odoratus, 95
Storeria dekayi, 102
wrightorum, 114, 115
striata, Tantilla, 119
stuarti, Scincella cherriei, 20
subnitens, Scincella, 19
subocularis, Elaphe, 3, 9
subrubrum, Kinosternon subrubrum, 116
suspectum, Heloderma, 37
sylvatica, Rana, 74
taeniatus, Coluber taeniatus, 67
Masticophis taeniatus, 3, 9, 45
Tantilla flavilineata, 117-119
jani, 119
striata, 119
virgata, 119
taylori, Scincella assata, 20
telfairii, Leiolopisma, 17
tenere, Micrurus fulvius, 197-199
tenuis, Contia, 116
tergeminus, Sistrurus catenatus, 94
Terrapene, **2**
carolina carolina, 116
ornata, 3, 10, 54
terrestris, Bufo terrestris, 114, 115
tesselatus, Cnemidophorus, 3, 7, 30, 90, 91
Rhinocheilus, 92
tessellatus, Rhinocheilus lecontei, 3, 9, 92, 112
testaceus, Masticophis flagellum, 3, 5, 9
tetrataenia, Thamnophis sirtalis, 97
texana, Holbrookia, 7
Hypsiglena torquata, 28
texanum, Ambystoma, 49, 70
textum, Scincella, 19
Thamnophis, 1, 2, 84
elegans vagrans, 39, 97-100, 194-196
eques cyrtopsis, 9, 39, 93
marcianus nigrolateris, 40
ordinatus parietalis, 85, 87, 88, 120
ordinoides, 97, 98, 100
vagrans, 67
radix, 71
haydenii, 93
rufipunctatus, 40
sirtalis, 99, 100
concinnus, 97
pickeringii, 97, 99
sirtalis, 71, 73
tetrataenia, 97
subcarinatus megalops, 40
Thecadactylus rapicaudus, 55
tigrinum, Ambystoma, 74
Ambystoma tigrinum, 49
tigris, Cnemidophorus tigris, 3, 5, 7
torosus, Triturus, 128, 132
Trachycephalus, 26
insulsus, 26

marmoratus, 25
Tretanorhinus variabilis variabilis, 96
travankorica, Scincella, 20
triseriata, Pseudacris nigrita, 74
tristichus, Sceloporus undulatus, 31, 32
Triturus torosus, 128, 132
viridescens, 83, 126, 128, 132, 133
viridescens, 49
Tropidoclonion lineatum, 93
tropidonotus, Anolis, 55
turcicus, Hemidactylus turcicus, 22
Uma notata cowlesi, 36
notata, 36
undulatus, Sceloporus, 31
Urosaurus, 1, 3
graciosus, 36
ornatus linearis, 5
usta, Microhyla usta, 21
Uta, 3, 5
stansburiana hesperis, 36
stejnegeri, 3, 7, 34, 36
vagrans, Thamnophis elegans, 39, 97-100, 194-196
Thamnophis ordinoides, 67
valeriae, Haldea valeriae, 116
variabilis, Tretanorhinus variabilis, 96
variegatus, Coleonyx variegatus, 36
ventralis, Ophisaurus ventralis, 115
vigilis, Xantusia, 34
vioscai, Pseudotriton ruber, 50
virgata, Tantilla, 119
viridescens, Triturus, 83, 126, 128, 132, 133
Triturus viridescens, 49
viridis, Crotalus viridis, 5, 10, 34, 96
vulcanium, Scincella, 19
wislizenii, Crotaphytus wislizenii, 89
Gambelia wislizenii, 89
wrightorum, Storeria dekayi, 114, 115
Xantusia vigilis, 34
yumensis, Lampropeltis getulus, 13

C15